

# Bulk Milk Grader Manual and Study Guide



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Agriculture and Forestry, Government of Alberta

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# CHAPTER 1: Introduction

The purpose of this manual is to provide the bulk milk grader with the legislative requirements, policies and procedures involved in the collection of quality raw milk from a licensed dairy farm in Alberta. A working knowledge of this information is part of the requirement for a bulk milk grader licence in Alberta.

A bulk milk grader is a person licensed under the [Dairy Industry Act](#) as a bulk milk grader. This individual is responsible for taking samples of a producer's raw milk for the purposes of monitoring food safety on behalf of the government and Alberta Milk. The samples are used for determining the raw milk's quality, components, and obtaining data to determine the milk grade. Raw milk refers to milk that has not been pasteurized. The bulk milk grader is responsible for accepting or rejecting the raw milk at a dairy farm.

The bulk milk grader occupies a unique position in the milk marketing system. The bulk milk grader has responsibilities to both the seller and the buyer of the raw milk. These responsibilities include: taking a representative sample, measuring the volume, and grading the raw milk. The bulk milk grader is required to perform these responsibilities correctly at every milk pick-up. These responsibilities have a direct impact on the producer's milk payment, raw milk quality analysis, and the quality of the finished products.

The bulk milk grader has responsibilities to the general public for promoting food safety. Responsibility for a safe food supply is shared amongst a much broader group of stakeholders that includes producers, processors, importers, retailers, consumers, and government regulators. There is an increasing recognition of the fact that food safety is a continuum moving along a product chain from production through processing, transportation, storage, distribution, and the retail sale to consumers. If a safe food supply is to be maintained, there is a need to manage and control food safety at each of these points on the continuum.

The bulk milk grader is a food handler and as such, appearance and personal habits are important. There must be an appreciation for the importance of cleanliness and sanitation in the handling and protection of milk. To be successful, the bulk milk grader must possess various attributes and skills in addition to being able to operate a truck safely at the dairy farm and dairy plant.

Prior to determining volume, the bulk milk grader must check the milk for odour, obvious contaminants (e.g., flies, straw, etc.), as well as properly collect and care for milk samples. To properly grade the milk, a bulk milk grader must have a keen sensory ability to identify any abnormality. It is important to be familiar with farm tank installations and understand the factors

that affect milk measurement, representative sampling and grading of milk. Unsatisfactory conditions are to be reported to a Dairy Inspector.

The Dairy Inspector is responsible for ensuring regulatory compliance, and may enter and inspect any building, land, milk transport vehicle, or milk transport vehicle depot that the inspector believes is used in connection with a dairy farm, dairy plant, milk transport vehicle, milk transport vehicle depot, or laboratory where dairy products are tested under the *Dairy Industry Act*. The Dairy Inspector may enter and inspect any vehicle used to transport dairy products for sale.

# CHAPTER 2: Personal Appearance, Hygiene, and Biosecurity

Bulk milk graders work with a food product, and therefore should be dressed in clean clothing and appropriate footwear. Flip flops and sandals do not cover the feet, and therefore are not appropriate footwear. A clean and tidy appearance is not only necessary and practical for hygiene purposes, but also serves to enhance the bulk milk grader's professionalism. The confidence placed in the bulk milk grader by producers and processors will be enhanced by professional conduct and appearance. Safe, courteous operation of the transport vehicle at the farm, on the road, and at the dairy plant is also part of professional conduct, and is expected of all drivers.

Proper personal hygiene should be practiced every day. A few minutes taken to wash your hands prior to measuring the milk will decrease the possibility of the milk being contaminated. Use warm water and soap for hand washing and be sure to lather the hands. Simply rinsing the hands with water from a hose or tap is not satisfactory. It is recommended that properly stored and dispensed single service paper towels be used to dry the hands. Cleanliness of the hands includes ensuring fingernails are clean. It is also recommended that you avoid using odorous skin treatments, as this may affect your ability to assess the odour of milk that you are grading.

Job functions cannot be performed if the bulk milk grader is infected with, or carrying any contagious disease that is transmitted through milk. While collecting milk, any open lesions must be covered with a waterproof covering so that the milk is not contaminated. Contamination is defined as "the introduction to or occurrence in dairy products, equipment and utensils in contact with dairy products or the dairy products environment of any biological or chemical agent, pathogen, pest, foreign material or substance that has the potential to compromise food safety or render the dairy product unfit for human consumption and sale."

Biosecurity in the Dairy Industry is increasingly becoming a focus on dairy farms. Biosecurity refers to measures taken to keep pathogens or disease agents out of dairy herds, and to prevent human pathogens from entering the food chain. Practices that promote Biosecurity include:

- Only driving the bulk milk truck to areas necessary to pick up milk.
- Limiting foot travel to areas between the bulk milk truck and the milk house.
- Sanitizing footwear or wearing disposable foot coverings when appropriate, and preventing contamination of clothing with farms soils.
- Not carrying food or food products into the milk house.

- Limiting travel in the milk plant to the receiving room and/or other specified areas.

For security reasons, some dairies have video security systems in place which monitor activities at the dairy including the milk house. As a Bulk Milk Grader you should be aware that your activities in the milk house may be monitored



# CHAPTER 3: Bulk Milk Grader Licensing

The *Dairy Industry Act* (Chapter D-2) and the [Dairy Industry Regulation](#) (Alberta Regulation 173/2019) require that all individuals who take samples of a producer's raw milk must hold a valid bulk milk grader licence. The Act in Section 4(3) states that no person other than an inspector or a person who holds a bulk milk grader licence shall take samples of a producer's raw milk for the purposes of:

- a) determining its weight, volume, contents and milk components, and obtaining data to determine the grade, and
- b) accepting or rejecting the raw milk at a dairy farm.

## Administration of Licence

The Inspection and Investigation Section of Alberta Agriculture and Forestry is responsible for the licensing of bulk milk graders. All applications (see Appendix 1) should be sent to Inspection and Investigation Section.

To be eligible for a licence, or to renew a licence, a person must pass both a written and practical examination. To obtain a licence (which has a term of five years) the applicant must:

- achieve 80% on the written exam, and
- obtain a satisfactory field inspection report from the examining Dairy Inspector.

The field exam of milk collection procedures should be held within two weeks of writing the exam. If the applicant fails one part of the two-part exam, the applicant may have the opportunity of repeating the failed part. A person whose application for a licence is refused, may apply to the Minister in writing, with reasons, requesting a review.

## Licence Term

The term of a licence expires on December 31 of the fifth year following its issue, unless a different expiry date is specified by the Director on the licence. A licence issued under this Regulation is not transferable.

## Random Inspections

Dairy Inspectors perform random inspections to determine if a bulk milk grader is carrying out the licensed duties properly. During an inspection, the various aspects of sampling, handling and storing of samples are checked. The milk transport vehicle is also subject to inspection, thus cleanliness of the bulk milk truck and equipment must be maintained. If deficiencies are noted, stricter surveillance will occur and the licence holder may have to rewrite the exam.

## Suspension or Cancellation of Licence

The bulk milk grader's licence may be suspended or canceled if:

- provisions of the *Dairy Industry Act* are contravened,
- provisions of the Dairy Industry Regulation are contravened,
- conditions imposed on the licence are contravened,
- the licence holder has provided false or misleading information on the application for a licence,
- the individual holder owes fees under the *Dairy Industry Act*, or
- recommended procedures are not followed.

If, in the opinion of the Director, the holder of a licence issued under this Act has failed to comply with this Act, the regulations, or the conditions imposed on the licence, the Director may, by giving written notice to the licensee, suspend or cancel the licence.

# CHAPTER 4: Milk Grading and Sampling

## Milk Grading

The *Dairy Industry Act*, Section 12(1), provides the details in how the data collected by a milk grader is utilized as a key component on which the settlement for the sale by a producer is made. The volume content and quality of the milk are some of the factors used to make these determinations states:

To grade the milk, the bulk milk grader must assess various characteristics of the milk to determine any:

- Abnormality in colour

Pink colouring is caused by presence of blood in the milk which likely has resulted from internal bleeding of the udders.

- Abnormality in odour
  - “Sour/malty smells” are caused by high bacterial activity in the milk when it was stored at high temperatures. This milk may also appear to be “curdled”.
  - “Rancid smells” can be caused by over agitation and foaming, and milk from “mastitic cows”
  - “Feed smells” can be caused by the feed of cattle, if within a few hours of milking time.
  - “Barn smells” can be caused by the cow’s environment as a result of dirty housing, musty hay, manure, and general cleanliness issues.
  - “Chemical smells” can come from the milk taking on the smells of the cow’s environment including chemicals which are stored in the milk house.
- Abnormality in temperature
  - If the milk temperature is greater than 4°C, the milk is unacceptable.
  - If there are ice crystals in the milk, or some of the milk is frozen this milk is unacceptable.
- The presence of any contaminants or physical defects in the milk makes it unacceptable. This can include:

- Foreign debris such as flies, straw, or any other non-milk matter.
- Physical defects such as fat clumps (also known as butterballs) or melted butter fat (also known as “oiling off”).



**Butterballs**

## Milk Sampling

According to the Dairy Industry Regulation, all samples taken by the bulk milk grader must be from milk that has been well agitated, and before any milk is pumped out of the tank. This is to ensure that the samples are representative of the entire milk contents in the bulk tank, and universal in that the samples can be used at the laboratory for milk component and/or bacteriological analysis. Sterile sample vials are used, and the samples are collected with a sanitized dipper in an aseptic manner to ensure that no bacteria or foreign matter are added to the samples. Aseptic as defined on internet as “free from contamination caused by harmful bacteria, viruses, or other microorganisms.”

A sample of milk for testing must be taken in an aseptic manner and be maintained at a temperature between 0°C and 4°C. The samples must be immediately placed in ice water to maintain their temperature at less than 4°C. Place the sample upright in the rack surrounded by ice water in the insulated sample case. Ensure that the samples are not submerged. See Chapter 8, Bulk Milk Pick Up Procedures, for additional details relating to grading and sampling of raw milk.

A bulk milk grader who takes a sample of raw milk to determine its content and milk components, and to obtain data to determine the grade, must deliver the sample to a processor. A bulk milk grader must deliver a sample of milk from each producer taken to a processor, who must deliver all samples to an approved laboratory in accordance with the timetable of the approved laboratory.

If by error a sample is not taken, misplaced, or lost, advise your Dairy Inspector or call the Alberta Agriculture and Forestry Hotline at 1-866-252-6403 to notify them of this issue.

# CHAPTER 5: Alberta Raw Milk Quality Standards

The Dairy Industry Regulation (AR 173/2019), Schedule 2, describes the raw milk quality standards in Alberta. These standards for raw milk align with the standards found in the [National Dairy Code](#). The tests used in Alberta to determine compliance with the raw milk standards are the individual bacteria count, freezing point determination, somatic cell count, and drug residue analysis. These tests are performed on all viable samples that arrive at Central Milk Testing. This is why it is essential for Bulk Milk Graders to obtain accurate and aseptic samples at each location attended.

**Individual Bacteria Count (IBC):** Bacteria counts are determined using a microbiological test to indicate the number of total bacteria in a sample. Most producers have little difficulty producing milk with an IBC of less than 15,000 bacteria/ml. The provincial regulatory limit is 121,000 bacteria/ml (Regulation, Schedule 2).

**Freezing Point:** Milk is checked for added water by an indirect method using infrared technology. Milk with added water is an abnormality that may result in rejection of the shipment of milk.

**Somatic Cell Count:** It is normal for milk to contain a small number of white blood cells and body (epithelial) cells. Values in excess of the provincial average, which is in the range of 200,000 cells/ml in bulk tank samples may indicate an udder health problem in some lactating animals in the dairy herd. The provincial regulatory limit (maximum allowable) is 400,000 cells/ml (Regulation, Schedule 2).

**Inhibitors and Drug Residues:** Dairy producers occasionally need to use drugs such as penicillin or other medications to treat a sick animal. Some consumers may be severely allergic to the drugs used. Some cultured dairy products may not develop in the presence of drugs. Therefore, producers must carefully check and follow instructions on the product label and not allow milk from treated cows to enter the bulk tank until after the specified withdrawal times.

An "inhibitor" is defined as any antibiotic, drug residue, or other foreign chemical substance in a dairy product whose presence in the dairy product is confirmed as a positive result using an approved method.

The Regulation requires that every load of raw milk arriving at the dairy plant must be checked for drug residues before it is received. Loads testing positive for drug residues are rejected and discarded so that the contaminated milk does not enter the human food supply. Producers found to have drug residues in their sample are penalized under the Milk Grade and Price Program.

## **Summary**

Dairy producers, dairy processors, and Alberta Milk rely on the licensed bulk milk grader to consistently follow the proper sampling procedures in order to obtain an aseptic sample which accurately represents the chemical, physical, and microbiological composition of the milk. These samples are of critical importance in determining compliance to provincial milk quality standards and the milk grade for which the producer's payment is determined under the Milk Grade and Price Program. A carelessly taken sample may affect the results of the milk quality analysis, and the producer's income.

# CHAPTER 6: Bulk Milk Storage Tanks on Dairy Farms

A "bulk milk tank" is defined as a stationary storage tank used for the cooling and holding of raw milk on a dairy farm, and includes the fixtures and equipment used in connection with it. The Dairy Industry Regulation, Section 39, states "no person shall receive milk from a bulk milk tank unless the person is a licenced bulk milk grader."

## Milk House

A "milk house" is defined as a building, room or rooms on a dairy farm used for cooling and storing milk or farm-separated cream, and for cleaning and sanitizing equipment used in the production and storage of raw milk or farm-separated cream.

A producer must have a milk house and must use it exclusively for:

- cooling and storing milk and farm-separated cream, and
- cleaning, sanitizing, and storing materials, milking equipment and utensils used in the production and handling of milk and farm-separated cream.

A milk house must have:

- a concrete apron that is outside the milk house and directly below the hose port:
  - that is connected to the main entrance of the milk house by a concrete walkway,
  - that is large enough, so that the hose of the milk transport vehicle cannot contact ground other than the concrete walkway,
- a grounded exterior electrical outlet adjacent to the hose port and controlled by a bipolar switch located on the interior wall of the milk house in a location accessible to the bulk milk grader, and
- a window in the milk house that permits the bulk milk grader to observe the transfer pump compartment of the milk transport vehicle's tank from inside the milk house.



## Bulk Milk Storage Tanks

Within the Dairy Industry Regulation, there are numerous requirements for bulk milk storage tanks. The requirements that are important for a Licenced Bulk Milk Grader to know are as follows:

- The calibration chart and milk receipts for each tank should be attached to a wall mounted board located close to the tank. The serial number for the dipstick, chart, and tank must all match.
- A bulk milk tank must have mechanical agitation capable of restoring uniformity of all milk constituents throughout the tank without splashing or churning of the milk.
- A bulk milk tank must be equipped with an approved dipstick, gauge, or other measuring device to permit determination of the volume of milk contained in the tank on the basis of the calibration table bearing the same serial number as the dipstick or gauge and the tank.
- The milk contained in a bulk milk tank on a dairy farm must be maintained at a temperature of between 0°C and 4°C until collection.
- A bulk milk tank must be used exclusively for the storage and cooling of milk.
- A bulk milk tank must be emptied at least once every two days, unless approval for a longer period is granted.
- A bulk milk tank must be cleaned and sanitized each time it is emptied.

# CHAPTER 7: Bulk Milk Collection Requirements

## Legislative Requirements

It is very important that the Licenced Bulk Milk Grader is aware of the Legislative Requirements of his/her duties. These requirement are detailed in the Dairy Industry Regulation, Section 40 as follows:

1. A bulk milk grader must:
  - a) wear clean clothing while performing any activities, duties or functions under this Regulation,
  - b) not be infected with or carry any communicable disease that is transmitted through milk, and
  - c) wear a waterproof covering over any open lesion (cuts and scratches) so that the milk is not contaminated.
2. A bulk milk grader shall not collect milk from a bulk milk tank if:
  - a) the milk in the tank has been seized or placed under detention by an inspector under Section 11 of the *Dairy Industry Act*, has been ordered by an inspector under Section 14 of the Act to cease supplying milk, or has been ordered by an inspector under Section 18 of the Act to not sell or supply a shipment of milk,
  - b) the producer has been prohibited from shipping milk by an inspector under Section 11 of the Act, has been ordered by an inspector under Section 14 of the Act to cease supplying milk or has been ordered by an inspector under Section 18 of the Act to not sell or supply a shipment of milk,
  - c) the producer does not hold a Producer Licence in good standing, issued by the Alberta Milk or by the Director,
  - d) the milk contained in the bulk milk tank is not acceptable on the basis of its appearance, odour, temperature, or other observable abnormalities.
3. A bulk milk grader, when collecting milk at a dairy farm, must:
  - a) ensure that hands are clean before handling or touching equipment,
  - b) measure the volume of milk contained in the producer's bulk milk tank,
  - c) clearly identify samples as required by the Director,
  - d) take a representative sample of milk from each bulk milk tank to conduct tests for the purposes of the Act and the [Marketing of Agricultural Products Act](#)
    - i. by means of a mechanical sampler on the milk transport vehicle, or

- ii. directly from the producer's bulk milk tank using a sanitized dipper rinsed in the milk prior to sampling, pipette, or other sanitary sampling device, following agitation of the milk contained in the tank for at least five minutes or as otherwise required by the Director to assure homogeneity of the milk.
    - e) record on a collection report all information required by the Director.
    - f) under NO circumstances ever taste test the milk
4. A bulk milk grader must use the hose port when transferring milk from a bulk milk tank to a milk transportation tank.
5. When a bulk milk grader completely empties a bulk milk tank, the grader must ensure the tank is rinsed immediately after it is emptied.
6. A bulk milk grader must deliver samples of milk taken under this section to a processor who must deliver:
  - a) a sample to an approved laboratory at least four times a month in accordance with the timetable of the approved laboratory, and
  - b) any additional sample requested by an inspector or analyst.

## Supplies

Before the bulk milk grader starts out on the milk pick-up route, ensure the following equipment and supplies are available to do the job properly.

Items supplied by Bulk Milk Grader or Milk Hauling Company:

- a watch,
- a waterproof felt tip pen,
- a flashlight to better grade the colour of the milk,
- a properly designed, insulated sample box with a rack for holding samples upright,
- a steel pocket thermometer,
- crushed ice,

Items supplied by the approved lab or Alberta Agriculture and Forestry:

- sterile sample vials,
- dippers,
- milk rejection tags

Items supplied by Alberta Milk for their clients:

- Personal Data Assistant (PDA handheld device)

If the regular dipper supplied to the producer by the approved lab (currently the Central Milk Testing lab) does not have a sufficiently long handle, arrangements for a longer handled dipper should be discussed with the producer. The producer should be advised to contact Alberta Milk or the approved lab, and a long-handled dipper will be supplied to them.

## Milk Temperature

The acceptable temperature range for milk to be transferred is between 0°C and 4°C. Under no circumstances should milk be transferred at higher temperatures.

The desired temperature must be achieved in the following manner:

- the first milking placed in the bulk milk tank must be cooled to 10°C or less within one hour after completion of milking, and to between 0°C and 4°C within 2 hours after milking and maintained at that temperature;
- the blend temperature, when subsequent milkings enter the tank, may not rise to above 10°C and the milk must be cooled to between 0°C and 4°C within one hour after milking and maintained at that temperature.

It should never be assumed that the cold milk already in the tank truck would cool down the received warm milk.

## Grading and Sampling

Every producer's milk shipment must be graded (appearance, smell, and temperature) prior to being loaded. No exceptions are allowed. If the milk is determined to be unacceptable, it must be rejected. The producer is responsible for disposal of the milk.

## Agitation

Thorough agitation is essential to get a sample that is representative of the milk in the bulk tank. In order to take a representative sample of all of the components in the producer's bulk tank, they must be agitated for a minimum of time required for the capacity of the tank.

The producer and processor depend on the bulk milk grader to take a representative sample and the proper measurement as payment is based on the volume, various milk components, and the

quality of milk. All milk fat tests that differ by more than 0.5 higher or lower than the previous test are reported to the Dairy Inspector for possible follow-up.

On average, milk is composed of 87.5% water, 4.8% milk sugar, 3.5% milk fat, 3.2% protein and 1.0% minerals. Milk also contains bacteria and somatic cells. Milk fat, being the lightest component, rises to the surface as cream when milk is allowed to remain unagitated for any length of time. As fat rises, it carries with it somatic cells.

#### *Importance of Agitation Times*

Sample Number	Sample Description	Individual Bacteria Count (cells / ml)	Fat (%)	Somatic Cell Count (cells / ml)
1	From an unagitated tank.	42,000	8.34	4,500,000
2	From the drain of an unagitated tank.	26,700	0.49	110,000
3	After five minutes of agitation	12,600	3.67	74,000

The results obtained from Sample Number 1 and Number 2 clearly show the large difference in the composition of milk when taken from the top and bottom of the tank. Sample Number 3 indicates the results of a sample lifted after proper agitation. Notice the dramatic change in the percentages for each component. These results clearly show the importance of proper agitation to ensure that the results will accurately reflect the quality and composition of the milk being sampled.

The minimum agitation times are set according to the volume of the tank (i.e. five minutes for tanks up to 5,678 litres and ten minutes for tanks above 5,678 litres). The larger volume of milk, the shape of the bulk milk tank, and surface area of the milk are factors affecting the time required to agitate the milk in the larger tanks. Although larger tanks may have more than one agitator this does not mean that the tank will be adequately agitated in a shorter period of time. It is very important to agitate the milk for the prescribed times to ensure that the milk sample will accurately reflect the quality and composition of the milk. **These minimum agitation times are an essential part of the 3-A Standards for Bulk Milk Tanks and must be adhered to.**

## Transfer Hose

The transfer hose should be passed through the hose port. Hands must be washed again after transferring the hose if they become soiled. Ensure that the hose is attached tightly to the bulk tank outlet to prevent air from being drawn in during pumping. Do not open the bulk milk tank valve until all sampling duties are completed.

After transferring the milk, ensure that as much milk as possible has been removed from the hose. Milk that remains in the hose will warm and allow bacteria to grow. This milk will become a source of contamination for the entire load.

## Milk Transport Vehicles

Milk transport vehicles may be used only for the transportation of milk, cream, or potable water unless otherwise authorized.

Tank standards are detailed in Section 42 of the Dairy Industry Regulation. The sections of these regulations which are most important for a Bulk Milk Grader to know are as follows:

- (4) The milk transportation tank and related equipment of the milk transport vehicle must be cleaned and sanitized at least once a day in a manner that prevents contamination of the milk.
- (5) If more than one shipment is collected in one day in a milk transport vehicle, the pump, hoses, and fittings of the milk transport vehicle must be washed between shipments.

# CHAPTER 8: Bulk Milk Pick Up Procedures

The complete sequence of events involved in the grading, universal sampling, and collection of bulk milk after the bulk milk grader/hauler arrives at the farm are outlined in this chapter.

## Milk Pick Up Procedure

1. If the agitator is not running and the milk is motionless, carefully grade the milk by sight and smell.
2. If the milk is not acceptable or if you are in doubt, take at least two samples for the milk plant receiver to check. Leave the milk in the tank. Notify the producer and Alberta Milk immediately of your rejection of the bulk milk. Complete the rejection procedure outlined in Chapter 9 of this manual.
3. If acceptable, ensure that the milk in the tank is motionless prior to measuring with the dipstick. At least three readings must agree before a measurement is recorded. When a tank is full to capacity, do not record more milk than what the calibration chart allows. For the Bulk Milk Graders who make pickups from a dairy that still uses a sight glass, please review Appendix 4 for these procedures.
4. If the volume of the milk in the tank exceeds the capacity of available space in the bulk milk truck, terminate the pick-up, and advise the plant and trucking office. Return that day to obtain the entire load of milk.
5. Add an entry on the Farm Pick-Up Record (log sheet).
6. Commence timing and **ensure that the bulk milk tank is agitated for a minimum of five minutes for tanks of a capacity of 5678 liters or less, and a minimum of 10 minutes for tanks of a capacity greater than 5678 liters or more** as may be specifically required for a tank.
7. While the agitator is running:
  - Check if the dipper is clean. If necessary wash, rinse, and sanitize the dipper before use.
  - Obtain a sample vial, attach the unique bar code sticker, and write the CMT number, your licence number, and the date on the vial with a waterproof pen.
  - Wash and dry hands.
8. After the required five minutes or more of agitation, verify the milk temperature with a sanitized steel pocket thermometer by holding the thermometer in the milk long enough to establish a steady temperature. All steel thermometers should be routinely calibrated. The

needle should read 0°C after placing the thermometer in an ice water bath. If not calibrated correctly and an adjustable type, adjust the nut on the back of the thermometer. Electronic thermometers are recommended, preferably those with a one-metre probe extension. Never use a glass thermometer due to the possibility of breakage inside the milk tank. If the milk temperature is greater than 4°C, the milk should not be accepted. Follow rejection procedures as outlined in Chapter 9 of this manual.

9. If the milk is acceptable, take a representative sample of the milk. Away from the manhole, open the sample vial by pushing upward on the squared side of the vial lid without touching the inside. Discard the plastic tab in a garbage container. Hold the vial between the thumb and index finger, fill the dipper with milk and pour a sufficient amount into the sample vial to fill the vial to the fill line. Rinse the sanitized dipper at least three times in the milk to remove the sanitizer. Transfer 35 millilitres of milk into the vial. Do not fill the sample vial over the bulk tank opening as this process could contaminate the milk.
10. Seal the vial by closing the lid and making sure that it snaps closed. Check the seal to ensure there are no leaks. Thread the pigtail up through the square hole and down through round hole. Pull the pigtail tight so that it locks.
11. Immediately place the sample upright in the rack surrounded by ice-water in the insulated sample case so that it is maintained at a temperature from 0°C to 4°C during transit. Ensure that the samples are not submerged.
12. Rinse the ladle/dipper and place it in the sink or other appropriate location (i.e. for robots) for the producer to wash.
13. Enter data into the Personal Data Assistant (PDA handheld device) or milk receipt as needed.

The following data points may be required:

- the producer's CDC number,
- the linear measurement in centimeters and millimeters, or in inches and fractions thereof,
- the volume of milk as indicated by the chart,
- the exact temperature of the milk (do not round up or down),
- your bulk milk grader licence number,
- number of milkings.

14. Switch off the agitator and tank refrigeration if it is a direct expansion system.
15. Bring the hose through the hose port, remove the hose cap, and connect it to the bulk tank outlet.
16. Open the tank valve and start pumping milk into the truck tank.



17. When done pumping milk, disconnect the transfer hose, removing as much milk as possible, and place the hose in the truck.
18. Close the hose port.
19. Examine the tank for abnormalities such as sediment, milk fat granules, insects, or ice. Note the presence of any of these items on the milk receipt slip.
20. If empty, rinse the tank with lukewarm water or connect the Cleaned in Place (CIP) automatic system, or follow the instructions of the producer.
21. Close the lid so the tank remains wet until washed.
22. Flush away any milk spilled on the floor, and return the water hose to the rack.
23. Place all items in their proper place.
24. Put any waste materials in the waste receptacle.
25. Leave the milk house the same as when you arrived. If the lights were on, leave them on. If the lights were off, then please turn them off when you leave.
26. Advise the producer of any problems that may affect the quality of milk at present or in the future.

**If the agitator is running upon arrival, ensure that the bulk milk tank is agitated for a minimum of five minutes for tanks up to a capacity 5678 liters and a minimum of 10 minutes for tanks of a capacity greater than 5678 liters. Once the required agitation time has elapsed and the milk is motionless, grade the milk, measure the volume and take the temperature and samples as noted in the procedures described above.**

# CHAPTER 9: Milk Rejection Procedures

## Legislative Requirements

A bulk milk grader shall not collect milk from a bulk milk tank if:

- the milk in the tank has been seized or placed under detention by an inspector,
- the producer has been prohibited from shipping milk by an inspector,
- the producer does not hold a producer licence, in good standing, or
- the milk contained in the bulk milk tank is not acceptable on the basis of its appearance, odour, temperature, or other observable abnormalities.

The *Dairy Industry Act* and Dairy Industry Regulation provide guidance for the rejection of a producer's milk. Section 43 of the Dairy Industry Regulation, states if a producer's milk or farm-separated cream does not meet the requirements of Schedule 2, the milk may be rejected. Furthermore, Section 17 of the *Dairy Industry Act* provides the following regulation pertinent to the bulk milk grader:

1. A bulk milk grader may reject raw milk in a producer's bulk milk tank if, in the opinion of the bulk milk grader, it is contaminated, is abnormal in colour or odour, does not meet the temperature requirements set out in the regulations, or cannot be sampled in accordance with the regulations.
2. On rejecting raw milk under subsection (1), the bulk milk grader must give the producer, the processor who would have received the raw milk, and the Director written notice of the rejection and the reasons for the rejection.
3. If a producer is aggrieved by a bulk milk grader's decision to reject raw milk under subsection (1), the producer may demand that a sample of the raw milk be provided to a processor for a review of the decision.
4. No person shall mix raw milk rejected under this section with any other milk to be used for human consumption.

## At the Dairy Farm

If a bulk milk grader rejects a tank of milk due to any abnormality (i.e., odour, colour, temperature, large fat clumps, or other foreign material), the rejection procedure is as follows:

1. Complete the producer's milk receiving information (see Chapter 8 of this manual).
2. Immediately advise the producer, Alberta Milk at 780-491-2666 (if the milk is marketed through them), and Alberta Agriculture and Forestry (AF) Inspection and Investigation Section toll free at 1-866-252-6403. This hotline is available 24 hours a day, seven days a week for reporting dairy infractions to AF.
3. Obtain a representative sample of the milk for the plant milk receiver and the Dairy Inspector. Two samples are required. Ensure that there is a unique bar code on each vial, scan it into the PDA, and mark the vials "Rejected" with a waterproof pen. Keep the samples cool (0°C to 4°C) in the sample storage case.
4. Complete a red rejection tag (supplied by the approved lab or AF), and place it on the producer's bulk tank.

Note: The producer may appeal the rejection decision and request a plant milk receiver or Dairy Inspector to grade the milk. Under the *Dairy Industry Act*, Section 17(7), the Dairy Inspector's decision is final.

## At the Dairy Plant

### Drug Residues

Every load of milk arriving at a dairy plant must be screened for drug residues. If no drug residues are present in the load, it is received and unloaded. If the screening test is positive or even suspicious, the load is held, and a confirmation test is done at the plant. A load of milk that is confirmed positive for drug residues is destroyed.

A mechanism is in place whereby milk haulers are compensated for the extra time and expense involved in disposing of contaminated milk which is in turn administered by Alberta Milk. A Milk Transport Compensation Form (Appendix 2) must be completed by the hauler and plant representative to claim for the expenses incurred.

Those innocent producers whose milk was on the dumped load are paid for their milk through the Milk Grade and Price Program. The producer found to have drug residues in their sample is penalized through the program, and is not paid for the shipment in which the drug residues were found.

## **Other Attributes**

It is the bulk milk grader's responsibility to ensure that, through grading and monitoring of temperatures at the farm, only quality milk is received. If the bulk milk grader is unable to detect any defects in the milk at the dairy farm, the milk can be received.

Since only the bulk milk grader or an inspector may reject milk at the farm, and can do so for reasons of contamination, etc., it is the responsibility of the bulk milk grader to form an opinion about the milk in the bulk milk tank.

If a bulk milk grader fails to reject milk that was contaminated, and mixes it with acceptable milk, a producer or processor could make a case that the failure to detect and reject contaminated milk caused damage because of the bulk milk grader's failure to meet his or her responsibilities.

If a load of milk is rejected at the plant for any reason (i.e. appearance, odour, temperature, other observable abnormalities, drug residues) it cannot be brought to any other plant unless the bulk milk grader or hauling company receives the appropriate authority from Alberta Agriculture and Forestry or Alberta Milk. The bulk milk grader must contact Alberta Milk as soon as the load of milk is rejected to advise them of the reason for rejection and to receive further direction in respect to the disposition of the load.

# CHAPTER 10: Unloading Milk at the Plant

While at the plant, **for biosecurity and safety reasons**, the bulk milk grader, should not enter the raw milk receiving silo area or manufacturing plant.

Unloading the truck is the responsibility of the milk receiver. The manhole must be open before unloading to avoid collapsing the tank. The driver must ensure that the farm samples are taken by the receiver who will place them immediately in cold storage. A sample of milk from the tanker taken for testing must be taken in an aseptic manner and be maintained at a temperature between 0°C and 4°C.

The receiver will check the milk receipts against the number of samples to ensure that each producer's shipment was sampled. In addition, the plant receiver samples and grades the milk on the truck. If the load is found acceptable and free of drug residues, it is unloaded. Some plants also test for titratable acidity (Ph) and water content of the milk.

**Under no circumstances unload your milk at the plant if you are not sure that a sample of the milk has been obtained by the receiver, and that they have determined that the milk is acceptable to unload!**

While the milk is being unloaded and before leaving for the next pick-up, the pump hoses and fittings must be dismantled, washed, and sanitized. The plant should have facilities to assist with the cleaning.

Chapter 11 provides further specific information in respect to cleaning and sanitation.

After the last load of the day, the truck is thoroughly cleaned inside and out. An automatic system cleans in place (CIP) the inside of the truck tank. The wash hose for the spray balls must not be connected until all of the milk is removed from the tanker. This practice will prevent wash water from entering the tanker while it still contains milk. The CIP system cleans, acidifies, and sanitizes. As well, the CIP system monitors and records the various temperature settings used during the cleaning process. The outside of the vehicle is usually cleaned using a spray system. This should only be done after the vehicle has been emptied to prevent contamination of the milk.

The manhole cover, gaskets, breather, and pump parts are normally manually cleaned or placed in a circulating cleaning system. These parts are cleaned and sanitized before being reassembled. To prevent contamination of the milk, no washing should be done around the manhole until the tank wash starts.

# CHAPTER 11: Cleaning and Sanitation

## Definition of Dairy *Soil*

The word *soil* is used in the dairy industry to describe remaining milk residues or other foreign matter on any equipment used to produce, process, store, or transport milk. It consists mainly of milk constituents such as fat, protein, and minerals, including the minerals left behind from water and cleaning compounds.

## Types of Soil

- **Milkstone:** These deposits are the hard residual build-up of dried milk solids and the salts from water and washing solutions that deposit on the surfaces of milking equipment. These deposits are white in colour. Milkstone is an ideal place for bacteria to live and grow. Acid cleaners are commonly used to remove and control the build-up of milkstone on dairy equipment.
- **Protein Film:** These deposits are bluish to grey or may have a rainbow like appearance. If the film is not removed from the surfaces of bulk tanks and other milking equipment, it usually continues to build-up, and appears like apple sauce or varnish on equipment surfaces. Routine washing of the equipment using a chlorinated alkaline cleaner at recommended concentrations in hot water and with sufficient physical action will control any build-up of protein film.
- **Fat Film:** This type of film is evident when beading or droplets appear on equipment surfaces giving an oily appearance. Control is similar to that of protein films through the use of a chlorinated alkaline detergent in hot water.

## Cleaning

The purpose of cleaning dairy equipment is to remove this soil from the surface of the equipment leaving it clean after each use. Water is used to rinse away the easily dissolved residues. However, water alone is not capable of removing all types of soil therefore, certain washing compounds are added to the water to make the cleaning procedure more effective. The following types of cleaners are used on dairy equipment.

## Types of Cleaners

- **Alkaline Cleaners:** These types of alkaline detergents are used to dissolve fats, proteins, and other organic soils. Cleaners are usually chlorinated to enhance the removal of protein deposits. The cleaners have good rinsing properties which enable the loosened soil and detergent residues to be rinsed off the equipment leaving it clean. Since these detergents are corrosive, care must be used to protect from exposure to the skin.
- **Acid Cleaners:** These cleaners (which are composed of compounds such as phosphoric acid and citric acid) are used to remove the mineral deposits of milk and water. The deposits are commonly known as milkstone and slowly build-up on milk handling equipment. Never mix an acid cleaner with a chlorine sanitizer because extremely toxic chlorine fumes will be released!
- **Household Cleaners:** These cleaners are not recommended for purposes in the dairy industry. Liquid dish detergents do not do a satisfactory job, impart flavours in the milk, cause excessive foaming, and do not prevent milkstone deposits.
- **Sanitizers:** All equipment must be sanitized immediately prior to use. Milk contact surfaces cannot be properly sanitized unless they are clean. Chemical sanitizers (utilizing chlorine or iodine) are commonly used to sanitize the bulk milk transport tanker. Chemical sanitizers are effective if used when the equipment is clean and used in the proper concentration for the appropriate amount of time.

## Washing the Bulk Milk Tanker

All bulk milk trucks are Cleaned In Place (CIP). The effectiveness of CIP cleaning depends on four factors:

- chemical strength,
- circulation time,
- solution temperature, and
- velocity (physical action).

**The spray ball should be checked daily** to ensure that there is no foreign matter obstructing the flow.

The recommended CIP (Cleaned In Place) cleaning procedure is as follows:

1. **Rinse** the tank, pump, etc. with cool to lukewarm water (34°C to 37°C) until the water drains clear. A lukewarm rinse will take the chill off the tank walls. The first rinse removes about 90% of the milk residues.
2. **Wash** with a suitable non-foaming alkaline cleaning compound, at the temperature and strength recommended by the chemical manufacturer. The wash cycle usually takes 10 to 15 minutes with the wash solution temperature at 50°C to 60°C. Completely drain the wash solution at the end of this cycle. This step in the cleaning procedure should be altered periodically from alkaline to acid solution when necessary, depending on the alkaline cleaner used, the water hardness, temperature, and sanitizer used. The end temperature of the cleaning solution should be greater than 43°C to keep the fat in a liquid state, and thereby enhancing the removal of the milk fat.
3. **Rinse** again with (34°C to 37°C) water (preferably acidified) to neutralize and remove all remnants of the washing solution. The acidified solution will also help in the removal of any milkstone.
4. **Sanitize** as the final step. This cycle should last at least five minutes and be a cold solution so that the tank walls are left cool. Additional cycles may be added depending on the processing plant's requirements.

**Manual cleaning and sanitizing** is required of the pump, manhole gasket, hose exterior, and fittings after every load. Completely dismantle the pump and valves, handling the parts carefully. Rinse all items with clean warm water, followed by manually brushing the parts with a hot (50°C to 60°C) detergent solution. When all parts are thoroughly clean, place them on a clean rubber mat and rinse again with clean hot water. Follow with a sanitizing rinse using chlorine or other suitable sanitizer.

A bright clean truck, both inside and outside, is essential to the sanitary handling of milk. It also makes a favourable impression on the public. The sanitary condition of the bulk milk truck is subject to inspection by a Dairy Inspector. The operator of the bulk milk truck is responsible for the condition of the truck when he is operating it. Unsatisfactory conditions may jeopardize the licenced status of the bulk milk grader.



# CHAPTER 12: *Dairy Industry Act* and Regulation (Excerpts)

The following sections from the *Dairy Industry Act* and Dairy Industry Regulation are relevant to the bulk milk grader.

## ***Dairy Industry Act*, Chapter D-2 (Excerpts)**

Definitions - In this Act:

- (c) "bulk milk grader" means a person licenced under this Act as a bulk milk grader;
- (d) "contamination" means the introduction to or occurrence in dairy products, equipment, and utensils in contact with dairy products or the dairy products environment of any biological or chemical agent, pathogen, pest, foreign material or substance that has the potential to compromise food safety or render the dairy product unfit for human consumption and sale;
- (g) "dairy farm" means premises where one or more dairy animals are kept from which a part or all of the milk is sold, offered for sale or supplied for human consumption, and includes all buildings and land occupied or used in connection with the production of milk;
- (h) "dairy plant" means a building where a processor processes a dairy product, and the land associated with that building;
- (n) "milk" means a normal lacteal secretion obtained from the mammary gland of a dairy animal;
- (o) "milk component" means milk fat, protein and other solids or other components of milk designated by the Director;
- (p) "milk transport vehicle" means a vehicle used for the transport of milk or farm-separated cream from a dairy farm to a dairy plant or from a dairy plant to another dairy plant;
- (y) "raw milk" means milk that has not been pasteurized;

## **Inspection**

Access to premises:

8(1) For the purpose of determining whether this Act and the Regulations are being complied with, the Director and an inspector may, at any reasonable hour, enter and inspect any building, land, milk transport vehicle, or milk transport vehicle depot, other than a private dwelling place that is used as a dwelling, that the Director or Inspector believes on reasonable and probable

grounds is, or is used in connection with, a dairy farm, dairy plant, milk transport vehicle, milk transport vehicle depot or laboratory where dairy products are tested for the purposes of this Act.

(1.1) For the purpose of determining whether this Act and the Regulations are being complied with, the Director and an Inspector may, at any reasonable hour, enter and inspect any vehicle that the Director or Inspector believes on reasonable and probable grounds is used to transport dairy products for sale.

(2) In carrying out an inspection under this section, the Director or Inspector may:

(a) inspect, review, examine, evaluate and take samples from any package, dairy product, dairy animal, thing, process or activity to which this Act applies and photograph or otherwise record anything with respect to them that the Director or Inspector considers would be of assistance,

(a.1) stop and inspect a vehicle described in subsection (1.1) or a milk transport vehicle,

(b) require any person in a building or on the land that is, or is used in connection with, a dairy farm, dairy plant, milk transport vehicle depot or laboratory where dairy products are tested for the purposes of this Act, or in a vehicle described in subsection (1.1) or milk transport vehicle, to provide assistance to the Director or Inspector in carrying out an inspection and to be interviewed and to make full disclosure either orally or in writing about any matter concerning any dairy product, dairy animal, thing, process or activity to which this Act applies,

(c) on providing notice when practical, temporarily close or disconnect, or require temporary closure or disconnection of, anything, process or activity to which this Act applies,

(d) review, perform or require to be performed any tests that the Director or Inspector considers necessary on any package, dairy product, dairy animal, thing, process or activity in or on a dairy farm, dairy plant, vehicle described in subsection (1.1), milk transport vehicle or milk transport vehicle depot, and take samples and remove any thing, if necessary, for the purpose of having tests performed, and

(e) demand the production, within a reasonable time, of any licence, record or other document pertaining in any manner to compliance with this Act or the regulations and may on giving a receipt for it remove it for not more than 48 hours for the purpose of making copies of it.

## **Determination of Raw Milk Components**

20(1) A person who takes samples of, and tests raw milk delivered to a processor to determine its components and to determine whether the raw milk meets the requirements of the regulations must do so in accordance with this Act and the Regulation.

(2) A bulk milk grader who takes a sample of raw milk to determine its weight, volume, content and milk components, and to obtain data to determine the grade for the purposes of this Act and for the administration of the *Marketing of Agricultural Products Act*, including but not restricted to the Milk Plan, must, when required pursuant to the regulations, deliver the sample to a processor, and the processor must, in accordance with the regulations, deliver it to an approved laboratory.

## **Offences**

### **Offences RE: Contamination**

(2) A person who knowingly contaminates a dairy product that is for sale for human consumption is guilty of an offence and liable to a fine of not more than \$25,000.

### **Offences RE: Tests**

3(1) A person who contaminates or tampers with a sample of milk, farm-separated cream or dairy product taken for a test so that the results of the test could be affected is guilty of an offence and liable to a fine of not more than \$25,000.

(2) A person who knowingly misreads or misinterprets the results of any test made for the purposes of this Act or the regulations is guilty of an offence and liable to a fine of not more than \$25,000.

# APPENDIX 1 – Bulk Milk Grader Licence Application

## BULK MILK GRADER LICENCE APPLICATION Alberta Agriculture and Forestry - Inspection and Investigation Section

The completed application form must be accompanied by a fee of \$100.00, made payable to the **Government of Alberta**.

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Section 1: To be completed by the applicant

Name \_\_\_\_\_

Address \_\_\_\_\_  
\_\_\_\_\_

City \_\_\_\_\_

Postal Code \_\_\_\_\_

Phone \_\_\_\_\_

Employer Name \_\_\_\_\_

Address \_\_\_\_\_  
\_\_\_\_\_

City \_\_\_\_\_

Postal Code \_\_\_\_\_

Phone \_\_\_\_\_

Applicant's Signature \_\_\_\_\_

---

The completed application form and cheque payable to the **Government of Alberta**, in the amount of **\$100.00** for the licence fee (or pay with credit card by visiting <https://www.agric.gov.ab.ca/ardpay> and choosing "Animal Health and Assurance" as the program area) is due prior to, or at the time of, writing the exam and forwarded to:

Inspection and Investigation Section  
Alberta Agriculture and Forestry  
201, 5030-50 Street  
Olds, AB T4H 1S1

The application fee of \$100.00 must be included with the application form.

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Section 2: For Office Use

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Inspector \_\_\_\_\_

The personal information you provide to Alberta Agriculture and Forestry on this form is being collected under the authority of section 33(c) of the *Freedom of Information and Protection of Privacy Act* (FOIP) and is managed under Part 2 of the FOIP Act. The information you provide will be used for the purpose of administration of the Dairy Industry Regulation that is authorized under the *Dairy Industry Act*. Agriculture and Forestry will not use or disclose your personal information for any other purpose than stated, without written consent or unless required to do so by law. If you have any questions about the collection, use, or you would like to make a correction to the information you provided, please contact 403-755-1474.

# APPENDIX 2 – Alberta Milk Grade Form Used for Positive Inhibitor Test

This form is for completion by Alberta Milk Processors when milk tests positive for inhibitors and is not accepted at the processing plant.

Processing Plant	
Date Sample Tested	
Date Sample Picked up at Farm	
Truck Route	
Rapid Test Used	
Test Performed by	
Truck Compartment Positive, Front or Rear	
Initial Test Result on First Truck Compartment Milk Sample	
First Test Result on Second Truck Compartment Milk Sample	
Second Test Result on Second Truck Compartment Milk Sample	
Negative Control Sample(s)	
Positive Control Sample(s)	

**Data on producers affected.**

Sample Bar Code	Test Result	Volume
Total volume rejected		

Submitted by (please print)	
Title or Position	
Phone number	
Signature	

**Please submit this form to Alberta Milk and Central Milk Testing within 3 working days.**

<b>Alberta Milk</b> 1303 – 91 Street SW Edmonton, Alberta T6X 1H1	Phone 1-877-361-1231 or 780-453-5942 <b>Fax 780-455-2196</b>
<b>Central Milk Testing</b> 6909 116 Street NW Edmonton, Alberta T6H 4P2	Phone 1-866-816-5335 or 780-434-3440 <b>Fax 780-437-8015</b>

# APPENDIX 3 – Bulk Milk Grader – On Farm Collection Steps

## Bulk Milk Grader-On Farm Milk Collection Steps

### Please Note:

- You are restricted to visiting only the milk house area.
- You must wear clean and appropriate footwear, gloves, and clothing in the milk house area.

### Steps for On Farm Collection:

1. **Wash** hands prior to handling anything in the milk house.
2. **Grade** milk for abnormalities such as odour, colour and foreign matter (E.g.: butterballs, flies, blood, straw etc.).
3. **Measure** milk volume three times. (Record where required).
4. **Agitate** for required time:
  - a. **Tank size under 5678 liters = 5 minutes**
  - b. **Tank size over 5678 liters = 10 minutes**

*If the agitator is running upon arrival, ensure that the bulk milk tank is agitated for the required time for the capacity of the tank. Once the agitation is completed and the milk is motionless, grade the milk, measure the volume, take the temperature and samples as noted in the procedures described here. (This additional information inputted for clarification to original document sent.)*

5. **Verify** the temperature **after agitation** and record where required. Temperature must be between 0 and 4 degrees Celsius, one hour after milking is finished.
6. **Collect** a representative milk sample in clean vial:
  - a. **Identify** sample: Date, Licence, Producer Number, Bar Code.
  - b. **Use** a clean dipper and add milk to the fill line on the vial.
  - c. **Ensure** the locking tab has been secured.
  - d. **Place** the full vial in sample box immediately. Ensure the vial is partially submerged in ice water.
7. **Carry** milk hose into the milk house. **Connect** hose to bulk milk tank and pump milk into trailer tank. When the tank is empty, examine the interior for any abnormalities such as sediment, fat granules, insects, or ice and inform the producer.
8. **Rinse** the interior of bulk tank or turn on tank wash cycle. Flush away any spilled milk.

### Steps to REJECT a Tank of Milk:

1. **Contact** your supervisor.
2. **Collect** two samples and place in sample box.
3. **Complete** the rejection in the handheld device.
4. **Record** the rejection on the barn sheet.
5. **Advise** the producer, and tag the tank with a **RED** rejection tag.
6. **Advise** both immediately:
  - Inspection and Investigation Section: 1-866-252-6403
  - Alberta Milk: 780-491-2666

# APPENDIX 4 – How to Read a Sight Glass

## Procedure for Milk Tanks with Sight Glass

Certain bulk tanks are equipped with an external sight glass for measurement. By simply connecting the hose to the tank outlet, opening the valve, it will allow the milk to rise up in the sight glass. Care and attention in slowly opening the valve will prevent foaming in the sight glass. The measurement is obtained by moving the sliding marker to the appropriate stabilized milk level and reading the bottom of the meniscus (see Figure 1) formed in the tube.

The milk in the sight glass must be at the same temperature as the milk in the bulk tank in order to obtain an accurate reading. Warm milk in the sight glass will give a higher reading on the gauge due to the lower density of the warm milk.

If the meniscus in the sight glass cannot be clearly distinguished due to unclean or greasy interior of the tube, the sight glass requires a thorough cleaning.

*Figure 1: Reading the Milk Level*

